REMARKS

The Applicants thank Examiner Bello for his careful review of this application. Consideration of the present application is respectfully requested in light of the above amendments to the application and in view of the following remarks. Claims 1-52 have been rejected. Upon entry of this amendment, Claims 1-52 remain pending in this application. The independent claims for this application are Claims 1, 21, 24, and 41.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "Version with markings to show changes made."

Objection to the Drawings

The drawings stand objected to by the Examiner for failing to show every feature of the invention specified in the claims. Specifically, the Examiner alleges that the drawings fail to show the connection between the diplexer and the optical transmitter and optical receiver as recited in Claim 4. Furthermore, the Examiner alleges that the drawings fail to show the at least one optical receiver connected to each multiplexer as recited in Claim 3.

In order to overcome this objection, the Applicants have amended the claims to further clarify the connections identified by the Examiner that were allegedly unclear. Specifically, the Applicants note that Claim 3 has been amended as a matter of form to clarify the connection between the optical receiver and a respective multiplexer.

Regarding Claim 4, this claim was previously dependent on Claim 1. Claim 4 has now been amended to be dependent on Claim 3 which recites an optical transmitter and optical receiver. The Applicants advise that the connection referenced in amended Claim 4 is clearly illustrated in Figure 4. Accordingly, in light of the amendments and discussion above, the Applicants request reconsideration and withdrawal of this drawing objection.

Claim Rejections under 35 U.S.C. § 112, 2nd paragraph

The Examiner rejected Claims 3 and 13 under 35 U.S.C. § 112, 2nd paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicants regard as the invention. This rejection is respectfully traversed.

The Examiner comments on several technical features present in the claims. The Examiner's comments can be summarized as follows. Regarding claim 3, the Examiner questions how: (1) the optical receiver can be connected to each of the multiplexers; (2) an optical transmitter and a receiver within the laser transceiver node can be connected to a multiplexer; (3) the multiplexer can multiplex both downstream and upstream signals; and (4) only a single output of each receiver can be connected to a respective tap multiplexer. Regarding Claim 13, the Examiner alleges (5) the term "protocols" lacks proper antecedent basis.

Regarding the Examiner's first comment, the Applicants advise the Examiner that Claim 3 has been amended to overcome the drawing objection noted above. In addition, this amendment should overcome the Examiner's issue with this claim under 35 U.S.C. § 112, 2nd paragraph.

Regarding the Examiner's second through fourth comments, concerning how both a transmitter and a receiver can be connected to the multiplexer, the Applicants respectfully submit that the term "optical tap multiplexer" is clear and understandable to one of ordinary skill in the art.

More specifically, the Applicants submit that one of ordinary skill in the art recognizes that an optical tap multiplexer **440** can take parallel data originating from the optical tap routing device **435** and convert it to serial data which is then sent to the transmitter **325**. For optical signals received by the optical receiver **370**, the optical tap multiplexer **440** can receive serial data from the receiver **370** and convert it to parallel data for transmission to the optical tap routing device **435**. One of ordinary skill in the art recognizes that the optical tap multiplexer **440** performs the same functions and may be referred to as a Serializer-Deserializer (SERDES), as is known to those of ordinary skill in the art.

Regarding the Examiner's fifth comment that there is insufficient antecedent basis for the term "the protocols" in Claim 13, the Applicants have amended Claim 13 to be dependent upon Claim 12 rather than Claim 11.

Accordingly, in light of the above discussion and amendments, the Applicants respectfully submit that the claims are clear to one of ordinary skill in the art. Accordingly, reconsideration and withdrawal of this rejection are respectfully requested.

Rejections under 35 U.S.C. §§ 102 and 103

The Examiner has rejected Claims 1, 2, 5, 11, 12, 14, 15, 18-21, 24, 26, 27, 31-33, 35, 37, 39-41, 45-48, 51 and 52 under 35 U.S.C. § 102(e) as being anticipated by Pangrac (U.S. Patent Application Publication No. 2001/0030785). The Examiner has also rejected Claims 3, 4, 7-10, 13, 17, 23, 25, 29, 30, 34, 36, 43-44, 49 and 50 under 35 U.S.C. § 103(a) as being unpatentable over Pangrac.

The Examiner has also rejected Claims 6, 28, and 42 under 35 U.S.C. § 103(a) as being unpatentable over Pangrac in view of U.S. Patent No. 4,975,899 to Faulkner. In, addition, the Examiner has rejected Claims 6, 28, and 42 under 35 U.S.C. § 103(a) as being unpatentable over Pangrac in view of U.S. Patent No. 5,880,864 to Williams. The Examiner has also rejected Claims 16 and 22 under 35 U.S.C. § 103(a) as being unpatentable over Pangrac in view of U.S. Patent No. 6,356,369 to Farhan.

These rejections are respectfully traversed.

Independent Claims 1 and 21

The rejections of Claims 1 and 21 are respectfully traversed. It is respectfully submitted that the Pangrac, Faulkner, Williams, and Farhan references fail to describe, teach, or suggest the recitations enumerated in amended independent Claims 1 and 21. Specifically, these references fail to describe, teach, or suggest the combination of (1) an optical tap for dividing a downstream optical signal between one or more subscribers of the optical network system; (2) a subscriber optical interface connected to the optical tap for receiving the downstream optical signal from, and sending upstream optical signals, to the at least one optical tap; (3) a laser transceiver node for communicating optical signals between the data service hub and the optical tap; and (4) a laser transceiver node for apportioning bandwidth that is shared between groups of subscribers connected to a respective optical tap of the optical network system.

Figure 1 of the Pangrac Reference

The Applicants respectfully submit that the Examiner has mischaracterized the Pangrac reference in order to reject the claims of record. A full reading of the Pangrac reference reveals that the Examiner's characterization of this reference is improper and that this reference fails to teach all of the recitations of independent Claims 1 and 21.

The Pangrac reference in Figure 1 teaches a hybrid fiber/coax system that uses a significant amount of coaxial cable **137** to distribute signals among its cable modem subscribers. The Examiner alleges that the point of distribution **103** of the Pangrac reference is a laser transceiver node. However, the Applicants respectfully submit that the point of distribution **103** of the Pangrac reference does not communicate optical signals between the alleged data service hub **101** and the alleged optical tap **105**, as recited in amended Claims 1 and 21 of the present application.

Further, the alleged optical tap **105** of the Pangrac reference cannot be properly characterized as an optical tap, as recited in independent Claims 1 and 21. Reference numeral **105** in the Pangrac reference is an optical transceiver node that converts optical signals received from the optical transmitter **127** into electrical signals that propagate along coaxial cable **137**. Therefore, the optical transceiver node **105** of the Pangrac reference cannot anticipate nor obviate an optical tap that divides downstream optical signals between one or more subscribers of an optical network system.

Downstream from the optical transceiver node **105** of the Pangrac reference are gateways **139**. The Examiner argues that gateways **139** are subscriber optical interfaces, as recited in independent Claims 1 and 21. However, as noted above, the gateways **139** of Figure 1 communicate with the laser transceiver node **105** via coaxial cables that support only electrical signals. Therefore, one of ordinary skill in the art recognizes that the gateways **139** of the Pangrac reference simply cannot anticipate nor obviate a subscriber optical interface that receives a downstream optical signal from and sends upstream optical signals to an optical tap.

And lastly, the Pangrac reference emphasizes that its system is designed to assign each subscriber a particular frequency or wavelength and that bandwidth is not shared between any of the subscribers to the system. More specifically, the Pangrac reference emphasizes that each gateway **139** is tuned to a specific channel and that each gateway **139** does not share any bandwidth on its channel with other gateways **139**. See Pangrac, paragraph 008, last two sentences. The Pangrac reference further teaches that each upconverter **123** of the point of distribution **103** and RF modems **121** are assigned to a specific RF frequency channel. See Pangrac, paragraph 0044, last four sentences.

The Pangrac reference further states that a significant benefit of the system is the ability to deliver allocated, unshared bi-directional and deterministic bandwidth to individual subscribers. The Pangrac reference emphasizes that data destined for a particular subscriber or gateway **139** is assigned a specific and unshared bandwidth only to that subscriber. This is referred by the Pangrac reference as the ability to deliver one hundred fifty isochronous or time-dependent services. See Pangrac, paragraph 0073, first few sentences.

In contrast to the point of distribution **103** of the Pangrac reference, the laser transceiver node of the present invention apportions bandwidth that is shared between groups of subscribers connected to a respective optical tap of the optical network system. One of ordinary skill in the art recognizes that the Pangrac reference takes a diametrically opposite position with respect to bandwidth sharing compared to the recitations present in amended independent Claims 1 and 21.

<u>Figure 4 of the Pangrac Reference</u>

The Pangrac reference provides a teaching of a "more" optical system **400** in Figure 4. Like the hybrid fiber/coax systems described before it, the optical system **400** of Pangrac does not share bandwidth among gateways **139**. Instead, each gateway **139** is assigned a particular optical wavelength or channel. See Pangrac, paragraph 93, second and third sentences.

In other words, the point of distribution **103** does not provide any teaching for apportioning bandwidth that is shared between groups of subscribers connected to a respective optical tap of the optical network system, as recited in amended independent Claims 1 and 21. Instead, the wavelength division multiplexer/demultiplexer **405** propagates individual wavelengths to respective gateways **139** along separate optical fibers **437**. Further, the point of distribution **103** does not communicate optical signals with the data service hub **101**. Instead, the point of distribution **103** communicates electrical signals to the data service hub **101**.

The Faulkner Reference

The Examiner relies upon the Faulkner reference to address the cooling device deficiencies of the Pangrac reference. The Faulkner reference provides a teaching of heat sinks as mentioned in column 1, lines 8-16. However, the Applicants respectfully submit that the Faulkner reference does not make up for the numerous deficiencies of the Pangrac reference such as an optical tap dividing downstream optical signals between one or more subscribers or a laser transceiver node apportioning bandwidth that is shared between groups of subscribers connected to a respective optical tap, as recited in amended independent Claims 1 and 21 of the present application..

The Williams Reference

The Examiner relies upon the Williams reference to provide a teaching of Time Division Multiple Access (TDMA). However, the Applicants respectfully submit that the Williams reference does not provide any teaching of the protocol of Time Division Multiple Access (TDMA). Instead, the Williams reference teaches Time Division Multiplexing (TDM). The Applicants refer the Examiner to page 47, lines 13-22, of the present application which explains the difference between TDM and TDMA.

Further, similar to the Pangrac reference, the Williams reference describes an optical network system where each subscriber is assigned a particular wavelength. See Williams, column 11, lines 50-59. Therefore, one of ordinary skill in the art recognizes that the Williams reference cannot anticipate nor obviate a laser transceiver node for apportioning bandwidth that is shared between groups of subscribers connected to a respective optical tap.

The Farhan Reference

The Examiner relies upon the Farhan reference to provide a teaching of optical splitter. However, the Farhan reference does not make up for the numerous deficiencies noted above such as an optical tap for providing a downstream optical signal between one or more subscribers and a laser transceiver node for apportioning bandwidth that is shared between groups of subscribers connected to a respective optical tap of the optical network system, as recited in independent Claims 1 and 21 of the present application..

Summary for Discussion of Independent Claims 1 and 21

In light of the differences noted above, one of ordinary skill in the art recognizes that the aforementioned references cannot anticipate nor render obvious the recitations as set forth in amended independent Claims 1 and 21. Accordingly, reconsideration and withdrawal of these rejections are respectfully requested.

Independent Claim 24

The rejection of Claim 24 is respectfully traversed. It is respectfully submitted that the Pangrac, Faulkner, Williams, and Farhan references fail to describe, teach, or suggest the recitations enumerated in independent Claim 24. Specifically, these references fail to describe, teach, or suggest a method for communicating optical signals from a data service provider to at least one subscriber comprising the steps of (1) receiving downstream optical signals in a laser transceiver node from the service provider; (2) dividing the downstream signals between pre-assigned multiplexers in the laser transceiver node; (3) apportioning bandwidth between subscribers in the laser transceiver node; (4) multiplexing the downstream signals at the pre-assigned multiplexers; and (5) propagating respective combined downstream optical signals to at least one subscriber via at least one optical tap along at least one optical waveguide, as recited in independent Claim 24.

As noted above, the Pangrac reference does not divide downstream signals between pre-assigned multiplexers in the point of distribution **103**. Further, the Pangrac reference does not multiplex downstream signals at the pre-assigned multiplexers. Instead, the Pangrac, et al. reference assigns each subscriber a specific individual frequency or a specific individual wavelength.

Regarding to the Faulkner reference, this reference does not provide any teaching of dividing downstream signals between pre-assigned multiplexers or apportioning bandwidth between subscribers at a laser transceiver node. Instead, the Faulkner reference merely provides a teaching of passive cooling devices.

Referring to the Williams reference, similar to the Pangrac reference, it does not provide any teaching of dividing downstream signals between pre-assigned multiplexers at the laser transceiver node and multiplexing the downstream signals at the pre-assigned multiplexers. Instead, similar to the Pangrac reference, the Williams reference assigns each subscriber a specific wavelength as illustrated in Figure 5.

Referring to the Farhan reference, this reference does not provide any teaching of dividing downstream signals between pre-assigned multiplexers at the laser transceiver node and multiplexing the downstream signals at the pre-assigned multiplexers. Instead, the Farhan reference is relied upon by the Examiner to provide a teaching of an optical splitter.

In light of these differences, one of ordinary skill in the art recognizes that the aforementioned references cannot anticipate nor render obvious the recitations as set forth in independent Claim 24. Accordingly, reconsideration and withdrawal of this rejection are respectfully requested.

<u>Independent Claim 41</u>

The rejection of independent Claim 41 is respectfully traversed. It is respectfully submitted that the Pangrac, Faulkner, Williams, and Farhan references fail to describe, teach, or suggest the recitations enumerated in independent Claim 41. Specifically, these references fail to describe, teach, or suggest a method for communicating optical signals from at least one subscriber to a data service provider comprising the combination of (1) converting upstream optical signals to electrical signals at the laser transceiver node; (2) combining upstream electrical signals in the laser transceiver node; (3) apportioning bandwidth for at least one subscriber in the laser transceiver node; (4) converting the combined upstream electrical signals into optical signals; and (5) propagating the combined upstream optical signals to the data service provider along an optical waveguide, as recited in independent Claim 41.

As noted above, the point of distribution **103** of the Pangrac reference does not transmit optical signals to the data service hub **101**. Instead, the point of distribution **103** transmits electrical signals to its data service hub **101**. Therefore, the point of distribution **103** does not convert combined upstream electrical signals into optical signals.

Referring to the Faulkner reference, the Examiner relied on this reference to provide a teaching of a passive cooling device. The Faulkner reference does not provide any teaching of converting upstream optical signals into electrical signals at the laser transceiver node, combining upstream electrical signals in a laser transceiver node, and converting the combined upstream electrical signals into optical signals.

Referring to the Williams, this reference merely provides optical fibers **104** between a headend **105** and subscriber optical interface **102** as illustrated in Figure 1. The Williams et al. reference does not provide any teaching of converting upstream optical signals to electrical signals at a laser transceiver node, combining upstream electrical signals in the laser transceiver node, and converting the combined upstream electrical signals into optical signals.

Regarding the Farhan reference, this reference may provide a teaching of converting upstream optical signals to electrical signals in the reverse path receiver **405** if the reverse path receiver **405** was positioned in the hub **210**. However, the Farhan reference fails to provide any teaching of combining upstream electrical signals in the laser transceiver node or converting the combined upstream electrical signals into optical signals.

In light of the differences mentioned above, one of ordinary skill in the art recognizes that the aforementioned references cannot anticipate nor render obvious the recitations as set forth in independent Claim 41. Accordingly, reconsideration and withdrawal of this rejection are respectfully requested.

<u>Dependent Claims 2-20, 22-23, 25-40, and 42-52</u>

The Applicants respectfully submit that the above identified dependent claims are allowable because each of their respective independent claims are patentable over the cited references. The Applicants also respectfully submit that the recitations of these dependent claims are of patentable significance.

In view of the foregoing, the Applicants respectfully request that the Examiner withdraw the pending rejections of Claims 2-20, 22-23, 25-40, and 42-52.

Conclusion

The foregoing is submitted as a full and complete response to the Office Action mailed on April 25, 2001. The Applicants and the undersigned thank Examiner Bello for his consideration of these remarks. The Applicants respectfully submit that the present application is in condition for allowance. Such action is hereby courteously solicited.

If the Examiner believes that there are any issues that can be resolved by telephone conference, or that there are any formalities that can be corrected by an Examiner's amendment, the Examiner is urged to contact the undersigned in the Atlanta Metropolitan area at (404) 572-2884.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

1. (Once Amended) An optical network system comprising:

a data service hub;

at least one optical tap for dividing a downstream optical signal between one or more subscribers of the optical network system;

at least one subscriber optical interface connected to the optical tap for receiving the downstream optical signal from and sending upstream optical signals to the at least one optical tap;

a laser transceiver node disposed between the data service hub and the optical tap, for communicating optical signals between the data service hub and the optical tap, and for apportioning bandwidth that is shared between groups of subscribers connected to a respective optical tap of the optical network system, and

one or more optical waveguides connected between respective optical taps and the laser transceiver node, for carrying the upstream optical signals and the downstream optical signals, whereby the number of the waveguides is minimized while optical bandwidth for subscribers is controllable by the laser transceiver node in response to subscriber demand use.

3. (Once Amended) The optical network system of claim 1, wherein the laser transceiver node further comprises:

at least one multiplexer coupled to an optical tap routing device;

at least one optical transmitter connected to the at least one multiplexer, for transmitting downstream optical signals received from the data service hub to at least one subscriber optical interface of the optical network system; and

at least one optical receiver connected to [each] the at least one multiplexer, for receiving and converting upstream optical signals from at least one subscriber optical interface of the optical network system.

4. (Once Amended) The optical network system of claim [1] 3, wherein the laser transceiver node further comprises at least one diplexer connected to the at least one optical transmitter and optical receiver, each diplexer combining downstream RF modulated optical signals received from the data service hub with the downstream optical signals, each diplexer being connected to a respective optical waveguide.

13. (Once Amended) The optical network system of claim [11] 12, wherein one of the protocols comprises a time division multiple access protocol.

21. (Once Amended) An optical network system comprising:

a data service hub;

at least one optical tap for dividing a downstream optical signal between one or more subscribers of the optical network system;

at least one subscriber optical interface connected to the optical tap for receiving the downstream optical signal from and sending upstream optical signals to the at least one optical tap;

a laser transceiver node disposed between the data service hub and the at least one subscriber optical interface, for communicating optical signals between the data service hub and the optical tap, and for apportioning bandwidth that is shared between groups of subscribers connected to a respective optical tap of the optical network system, [the] at least one optical tap being disposed within the laser transceiver node, and

one or more optical waveguides connected between respective optical taps and the laser transceiver node, for carrying the upstream optical signals and the downstream optical signals, whereby the number of the waveguides is minimized while optical bandwidth for subscribers is controllable by the laser transceiver node in response to subscriber demand.